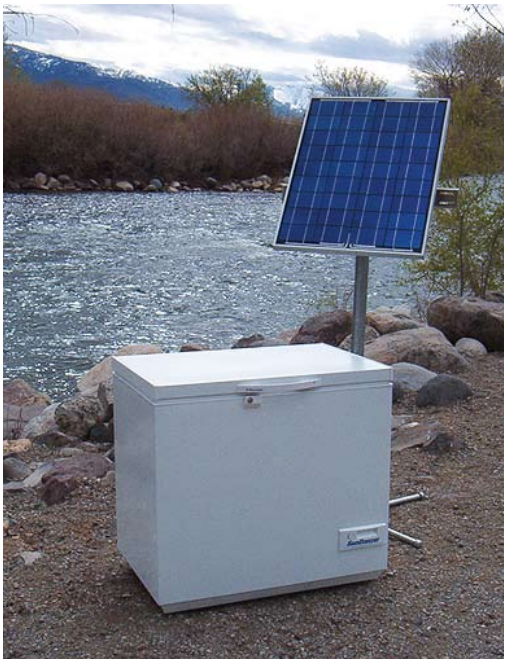
National Aeronautics and Space Administration

Company Licenses NASA Technology for Battery-Free Solar Powered Refrigeration Systems

Planned uses include vaccine refrigerators for remote locations and refrigerated containers for transporting food to U.S. troops.



SuncSanzer Refrigeration Inc. has obtained a non-exclusive license from NASA to patented battery-free solar powered refrigeration systems technology. Originally developed by innovators at NASA's Johnson Space Center who were investigating solar alternatives for cooling lunar bases, the technology can be used for a variety of purposes, including off-grid, battery-free refrigeration for food and drinks, air conditioning systems in remote locations such as field hospitals, and refrigeration of milk tankers and other transportation vehicles. SunDanzer is already using the technology to develop a battery-free solar powered refrigerator for storing vaccines and a refrigerated container for transporting food and beverages to remote military personnel.

Benefits of Technology Transfer

- **Addresses an unmet need:** Provides an alternate source of refrigeration for more than two billion people in the world whom the World Health Organization (WHO) estimates are without access to electricity
- **Costs less to use:** Uses no batteries and is simple, easy to use, and efficient; has low initial and ongoing operating costs; and is location independent, making it an excellent source of off-grid refrigeration
- **Helps the environment:** Offers a clean alternative to off-grid refrigerators that use gasoline-powered generators or batteries, which have a limited life span and lead to waste
- **Accommodates small and large storage needs:** Transfers easily to small- and large-volume applications and can be mass produced to meet a large demand

success

On the Record

"The WHO estimates that nearly two billion people in the world are without access to electricity that is essential for storage of vaccines and medicine. The battery-free solar refrigeration technology has the potential to greatly reduce the cost and increase the availability of vaccines delivered to the poorest, neediest people in remote regions around the world."
— *David Bergeron, CEO, SunDanzer*

"SunDanzer has the experience in manufacturing and marketing solar refrigerators, and this license will help them to quickly address an unmet need for low-cost, battery-free solar powered vaccine refrigerators. This is an excellent opportunity to use NASA technology to create a product that will help millions of people in undeveloped areas around the world."
— *Michelle Lewis, Patent License Manager, NASA's Johnson Space Center*

About SunDanzer Refrigeration Inc.

Founded in 1999 as Solus Refrigeration, Inc., SunDanzer builds cost-effective solar refrigerators that are optimized for off-grid or net-zero energy customers. Founded by David Bergeron, former leader of NASA's Advanced Refrigeration Technology Team, the company has been at the forefront of solar applications technology and is a leading supplier of refrigerator systems optimized for solar applications. Bergeron was the co-inventor of the original Johnson Space Center technology, which SunDanzer used to produce one of the world's first practical battery-free refrigerators.

About the Technology

The patented technology was originally developed by NASA's Johnson Space Center innovators, Bergeron and Michael Ewert, who were investigating the use of a photovoltaic (PV) solar heat pump for cooling lunar bases. They subsequently modified the technology and developed a refrigerator with a vapor compression (battery-free) heat pump that directly converts electricity from solar PV panels into thermal energy that is stored internally using a simple, low-cost, phase-change material.

The battery-free solar powered refrigerator technology can be used for a variety of purposes, including off-grid refrigeration for food and drinks, air conditioning systems in remote locations such as field hospitals, and refrigeration of milk tankers and other transportation vehicles. NASA received three patents for this system.

Addressing a Need through Technology Transfer

On January 13, 2010, NASA and SunDanzer signed a non-exclusive license to the patented solar powered refrigeration systems technology developed by Johnson Space Center. SunDanzer plans to use the technology to develop and market one of the first battery-free solar powered refrigerators suitable for safely storing vaccines. The company has also signed an agreement with the U.S. Army to develop a prototype for a refrigerated container for shipping food to U.S. Army personnel.

SunDanzer is currently working to obtain prequalification for its vaccine refrigerator under the Performance, Quality, and Safety immunization standards that were adopted in 2007 by the WHO.

The company is currently making changes to the unit's design prior to submitting it for third-party testing, a key step for the company to obtain WHO prequalification. If approved by the WHO, the unit would be one of the first to meet the new standards, a designation that is important to aid organizations, governments, and other entities that are the most likely purchasers of the solar powered vaccine refrigerator.

SunDanzer also signed a nine-month contract with the Army in February of 2010 to build a prototype of a battery-free solar powered refrigerated shipping container (20 feet by 8.5 feet by 8 feet) for transporting fruit, vegetables, and other perishable food to troops in remote locations. The company will take the technology used in its 3 cubic foot vaccine refrigerator to a larger scale in an attempt to provide the Army with a cost-effective alternative to refrigerated shipping containers that currently are powered by diesel generators.

For More Information

For more information about this and other technology licensing opportunities, please contact:

Advanced Planning Office
NASA's Johnson Space Center
Phone: 281-483-3809
E-mail: jsc-techtran@mail.nasa.gov
Web: http://technology.jsc.nasa.gov